1987

The Impact of Science on Jewish Culture and Society in Venice (With Special Reference to Graduates of Padua's Medical School)

David B. Ruderman
University of Pennsylvania, RUDERMAN@SAS.UPENN.EDU

The Impact of Science on Jewish Culture and Society in Venice (With Special Reference to Graduates of Padua's Medical School)

Abstract

In 1624, Joseph ben Judah Hamiz successfully completed his doctorate in philosophy and medicine at the University of Padua[1]. Besides the joy of Hamiz and his immediate family must have felt at this achievement, the event itself hardly seemed to merit any real significance either for Padua or for its Jewish community. In the beginning of the seventeenth century, a constant trickle of Jews were among the hundreds of students annually graduating from Padua's renowned medical school[2]. Nevertheless, Hamiz's graduation appears to have elicited an unusual outpouring of favorable, even elated, response from some of the most important luminaries of Italian Jewish culture of this era.

David B. Ruderman

The Impact of Science on Jewish Culture and Society in Venice

(With Special Reference to Jewish Graduates of Padua's Medical School)

In 1624, Joseph ben Judah Ḥamiẓ successfully completed his doctorate in philosophy and medicine at the University of Padua [1]. Besides the joy Ḥamiẓ and his immediate family must have felt at this achievement, the event itself hardly seemed to merit any real significance either for Padua or for its Jewish community. In the beginning of the seventeenth century, a constant trickle of Jews were among the hundreds of students annually graduating from Padua's renowned medical school [2]. Nevertheless, Ḥamiẓ's graduation appears to have elicited an unusual outpouring of favorable, even elated, response from some of the most important luminaries of Italian Jewish culture of this era. Undoubtedly, their reaction was encouraged by Ḥamiẓ's illustrious mentor, Leone Modena, who apparently undertook the responsibility of publishing an entire pamphlet of poems and approbations to honor his favorite prodigy [3]. Yet the participants' enthusiastic response appears to signal a genuine excitement over Ḥamiẓ's personal triumph, far exceeding the standardized conventions required by this literary exercise in public flattery. No less impressive is the wide spectrum of contributors, ranging from the expected – fellow classmate, Benjamin Mussafia [4] – to the less expected "wise man of secrets", Azariah Figo, Rabbi of Pisa [5]. For all of these distinguished panegyrists, Ḥamiẓ's rite of passage into the hallowed corridors of licenced medical practice was deservedly cause for celebration and commendation to both Ḥamiẓ and his own community of co-religionists.

Writing almost a hundred years later, the German orientalist Johann Jacob Schudt also had occasion to note the phenomenon of Jewish graduation from Padua's medical school. In contrast to the effusive accolades lavished upon Ḥamiẓ and his accomplishment by his fellow Jews, the German scholar could find nothing praiseworthy about Padua's indiscriminate admission of "every ignoramus and even the despised Jews", especially those admitted from his own country. According to Schudt, such practice was indeed unbecoming of so famous a university whose only motivation in welcoming such

unworthy degree candidates must have been its love of lucre, following the proverb: "We take the money and send the ass back to Germany" [6].

Two isolated notices of Jewish medical graduates from Padua almost a century apart – the first, adulatory, the second, deprecatory – both share, at least partially, a common insight. Padua's regularized and unprecedented admission and subsequent graduation of hundreds of Jews was a matter of no small consequence to the university, to its Jewish graduates and to the communities they eventually served. Indeed neither Ḥamiz's associates nor Johann Schudt were ever fully capable of appreciating the momentous significance of Padua's admission policy, spanning well over two centuries, for the development of Jewish culture and society in Padua, in Venice, in Italy and throughout the rest of Europe.

Both historians of Venetian and Paduan Jewry and historians of Jewish medicine have long acknowledged the presence of many Jews in Padua's medical school [7]. No less noticed have been the large numbers of these students originating from Central and Eastern Europe and returning to serve as physicians in their respective communities [8]. Yet beyond mention of the sheer number of these students, assorted biographical data about some famous graduates, and bibliographical references to their writings, the larger story of their encounter with one of the major centers of European culture in the early modern era remains generally untold. Padua, although not the only Italian university to welcome Jews, was the foremost center for training Jewish physicians from the sixteenth century well into the eighteenth, superseded only at the end of this period by more prominent medical schools in the North, such as the University of Leiden [9]. The Paduan experience is not distinctive merely because large numbers of Jews demonstrated a conspicuous interest and capacity for medical practice. Medical practice was already a well established profession among Jews both in Christian and Moslem societies long before the sixteenth century [10]. Nor does the mere admission of individual Jews to a European university define the novelty of Padua's Jewish encounter. Long before Padua, Jews had earned medical degrees; they also had served as physicians to important non-Jews and they had fostered conspicuous social and cultural liaisons with the upper echelons of Moslem and Christian society because of their medical practice [11].

The Paduan experience is unique, however, because for the first time a relatively large number of Jews graduated from a major medical school, entered the medical profession and practiced medicine across the entire European continent. Padua also was unique because it afforded the opportunity for intense socialization among

Jews from remarkably variegated backgrounds – former Conversos from Spain and Portugal, together with Italian, Turkish, German, Polish and Russian Jews. Moreover, Padua's university did not allow its Jewish students to segregate themselves socially and culturally by living and working among themselves. Jewish students at Padua had no collective identity; they were considered only as individual members of the Italian, German, or Polish "nations" and integrated physically among non-Jewish student populations [12].

Above all, Padua offered hundreds of talented Jewish students an intense and prolonged exposure to the study of the liberal arts, to Latin studies, to classical scientific texts, as well as to the latest scientific advances in botany, anatomy, chemistry, and clinical medicine. During the course of their systematic formal instruction which lasted at least five years, these young and impressionable Jewish youths were introduced to a radically new social network of close and intimate encounters with non-Jews, also originating from diverse communities all over Europe. Finally, Padua was special for Jews because its graduates, despite their dispersion throughout Europe, maintained social and intellectual ties with each other and constituted a significant cultural force within their respective communities years after their graduation [13].

From the perspective of Jewish history, Padua's medical facility thus constituted more than a center for training Jewish physicians. In its broader dimensions, it represented a major vehicle for the diffusion of secular culture, especially scientific culture, within the pre-emancipatory Jewish communities of Europe [14]. It provided one of the richest opportunities for Jews to familiarize themselves intellectually and socially with the best of European civilization, an encounter generally unavailable to the overwhelming majority of their fellow co-religionists. Ultimately, so formative an experience was bound to affect profoundly the cultural priorities, the values, even the self-image of such Jews.

Since the early fifteenth century, Padua was under Venetian control, and because of its proximity to Venice, the university became an official state institution of the Veneto and the primary center for training its lawyers and doctors. Ultimately, many of Padua's graduates returned to Venice to assume leadership roles in the Venetian government while maintaining a constant interest and direct voice in university policies and appointments [15]. Thus Padua's impact on Jews also is a chapter in Venetian history. Likewise, the cultural transformations of Paduan Jewry, stemming primarily from the university training offered to growing numbers of Jews, were directly felt, first and foremost, within the cultural sphere of the Venetian Jewish community.

Between 1517 and 1721 some 250 Jews received medical diplomas from Padua, and assuredly many more attended classes without matriculating [16]. Many of this number are well known for their contributions to Jewish culture and society: individuals like Joseph Delmedigo [17], Joseph Ḥamiz [18], Tobias Cohen [19], David Nieto [20], Solomon and Israel Conegliano [21], or Isaac Cantarini [22]. Others are hardly familiar at all. Ultimately only an exhaustive scrutiny of their lives and literary remains will yield a penetrating appreciation of their encounter with Padua and the impact this had on them and their communities. Such a task is clearly beyond the limitations of this preliminary study. Nevertheless, from what is known about the most illustrious of Padua's Jewish graduates and from what is available about the ambience of Paduan university life in general, the overall contours of this interaction already are evident.

At the beginning of the sixteenth century, European students favoring the University of Padua had good reasons for their choice. Padua generally was regarded as the best medical school in Europe. Although it nominally was a Catholic university, Protestant and subsequently Jewish students were not prevented from studying there [23]. The high level of medical training Padua offered was related directly to the significant place a university-educated doctor held in Italian society [24]. Unlike much of the rest of Europe, Italy enjoyed the availability of relatively large numbers of university graduates serving a wide spectrum of social classes both in the large cities and in the small towns. The Venetian government's keen interest in and consistent support of the university reinforced the high social standing of Padua's medical graduates [25].

Padua's success in attracting large numbers of foreign students – Germans, Flemings, Belgians, Dutch, Silesians, Poles, Russians, Hungarians, Spanish, French, Swiss, and English – was attributable to other reasons as well. Besides its scientific reputation, its geographical proximity to Venice undoubtedly was a great asset. The excitement of so great a commercial and intellectual center surely was contagious to medical students interested in familiarizing themselves with different places, climates, diseases, and drugs. The ideal of enlarging one's cultural horizons, together with the mythology associated with *la peregrinatio medica*, undoubtedly resonated in the hearts and minds of Padua's student body. And in a university where humanities courses were integrated into the scientific curriculum, Padua certainly was no stuffy parochial environment. For outside the walls of specialized study was the romantic ambience of Renaissance architecture, art, theatre and music augmented, no doubt, by excursions to exotic cultural treasures throughout Italy and beyond [26].

Padua's medical curriculum was based on a two-tier system of

courses to be completed over a five-year period [27]. During the first two years, students acquired a basic familiarity with logic and natural philosophy, based primarily on the texts of Aristotle. During the three-year cycle, students specialized in both theoretical and practical subjects, utilizing the basic texts of Hippocrates, Galen, Avicenna, and Rhazes. The instructor of theory would treat the general explanatory principles of health and disease, while his colleague in medical practice would cover the same ground from a more pragmatic perspective. In addition, a student would enjoy an ample exposure to the rest of the liberal arts curriculum. At the beginning of the sixteenth century, for example, students were expected to master Aristotle's rhetoric, Greek epigrams and poetic, Cicero's topics, his *Tusculanae Disputationes* and his *Somnium Scipions*, Sophocles' *Oedipus Tyrannus*, some writings of Demosthenes, Horace's first book of odes, Livy's history, and so on. All of this learning hardly was passive. Each doctor reading in arts and medicine was required to hold public disputations at least twice a year; seven students took part in each disputation. Every evening, informal disputation took place in the presence of instructors whose attendance was required at least one hour each day to allay student doubts. A typical graduate of the medical school accordingly received a doctorate of philosophy and medicine, a title earned upon mastering this remarkably integrated curriculum.

Padua's curriculum underwent major changes throughout the sixteenth and into the seventeenth century. By the late sixteenth century, through the collaboration of the Hospital of St. Francis at Padua, daily hospital rounds became a standard feature of Padua's clinical training [28]. Such bedside teaching still was unparalleled outside of Italy even by the end of the sixteenth century. In the same period, botany emerged as an autonomous subject in the Paduan medical curriculum and botanical gardens were established at the university. Professors of botany often included in their teaching the animal and mineral worlds as well. Herbaria often were supplemented by natural history museums. Observation and research in the natural sciences also led to experiments in alchemy and iatrochemistry [29].

This period also witnessed major developments in the teaching of anatomy and surgery. In 1594, the first permanent anatomical theatre elevated considerably the status of surgery at Padua while elsewhere in Europe its status was on the decline [30]. Finally, although inferior in the overall educational scheme, the mathematical subjects, including optics, mechanics, cosmography (astronomy and geography) and the like, were considered important adjuncts to medicine and were integrated as well into the curriculum [31]. By the end of the

seventeenth century, the scientific education Paduan medical students received was radically different from that of their medieval ancestors, who had focused primarily on the classical texts of medicine.

The intellectual feast offered by Padua's curriculum provided one primary dimension of the learning experience; the social circumstances of this learning provided another. Within, the university of arts and medicine, all student were organized according to their "nations". Each "nation" elected a councilor to serve the rector. Most of the non-Italian Jewish students belonged either to the German or Polish nations. As members of individual nations, they were assigned licensed lodgings in the city. Almost like religious confraternities or merchant guilds, the student "nations" constituted the primary social group for all students, providing them mutual aid and comfort and free medical care [32].

For a Jew, regardless of his origin, this environment was dramatically unlike anything he had ever encountered before. More often than not, he was unprepared linguistically, culturally, or socially for such an intense experience. With the exception of former Conversos, no group of Jews had ever lived so intimately as a tiny minority among such an international population. Few Jews arrived in Padua with the educational prerequisites to assume the rigorous course load of an entering medical student. The social and cultural shock of entering the university world, from even the most englightened of Jewish family backgrounds, was no less formidable. No doubt, the extraordinary challenges posed to Jewish religious sensibilities and ritual practice were similarly compelling. Problems of dietary and Sabbath observance were not the only obstacles in the path of the Jewish student. The emphasis on surgery and autopsies, many of which were performed on bodies obtained illegally, even from Jewish cemeteries, also was troublesome [33].

Despite the non-threatening circumstances of Padua's relatively tolerant policy toward non-Catholics, Jews still encountered special obligations and disabilities. Jews paid higher tuition than others; at the time of their graduation, they were taxed additionally by being obliged to deliver 170 pounds of sweet meat to Christian students [34]. No doubt such formal liabilities were only a small part of the abuses Jews encountered on a day-to-day basis in trying to compete with non-Jewish students. Thus Tobias Cohen, in decrying those Jews who practiced medicine without adequate university training, points explicitly to the hardships he and other Jews undoubtedly experienced as medical students: "Why should a doctor expend his time, increase his expenses, inflict his body and endanger himself in his study at the academies of the gentiles who hate Jewish students?" [35].

Above all, the Jewish student had to resist the temptations of

weakening or even losing his faith. Thus, from personal experience, Joseph Delmedigo could write: "This is a warning directed to those parents who cause their sons to sin by sending them to Padua 'to philosophize' before the light of the Torah has shined upon them so that the nature of faith would have been implanted previously in their souls in order that they not turn away from it" [36]. And elsewhere, he alludes to the problem of medical studies involving more than the limited mastery of medical texts: "How good it would be that you would request medicine from medical texts and faith from the source of Israel and not from the 'children of strangers and aliens' as the secular disciplines; therefore be faithful to the Lord your God" [37]. No doubt David Provincial had in mind the same problem when in the middle of the sixteenth century, he proposed the establishment of a Jewish institution of higher learning to train doctors, among others, insulated from the corrosive influences of general universities like Padua [38]. In similar fashion Solomon Marini wrote, at the beginning of the seventeenth century, of those he had seen who desired "to learn and understand philosophy without prior learning of our holy Torah" [39]. And certainly by the beginning of the eighteenth century the same issue remained critical for Tobias Cohen when he warned: "No one [Jew] in all the lands of Italy, Poland, Germany, and France should consider studying medicine without first filling his belly with the written and oral Torah and other subjects" [40].

Tobias resolved his problem, as did many other Jewish medical students at Padua, by taking advantage of an extraordinary Jewish network of educational and social services that prepared foreign students like himself and his classmate Gabriel Felix to enter the university. Thus he continues: "As I will testify also regarding the numerous students of my wise teacher [...] Solomon Conegliano, those of whom become rabbis and those of whom become physicians to kings and important princes; for I am the least notable among them all" [41]. The Jewish doctor Solomon Conegliano's preparatory school for Jewish students desirous of entering the university surely arose as a necessary solution to a set of pressing problems. Under the able direction of an illustrious graduate of Padua, Jewish students could master Latin, Italian, and other propaedeutic disciplines in order to prepare themselves sufficiently for university entrance. Moreover, Solomon's home obviously offered them an appropriate social and cultural setting, a kind of transitional "half-way house" between their own homes and the university itself. Most important of all, it provided the necessary spiritual reinforcement – "a filled belly of Torah" – to ward off all "heretical" inclinations fosterd by Padua's cosmopolitan setting. Conegliano trained students not only

for medical careers but also to become rabbis. Clearly both professional goals, when properly implemented under his guiding hand, were most compatible. Torah and medicine still were, as they had been in the past, the most natural and complementary of disciplines. Together they provided the most beneficial training for Jews to assume leadership roles either in the Jewish community or among "kings and important princes" [42].

The absence of concrete documentation does not allow us to conclude that institutions like the Conegliano boarding school were a staple of Jewish student life at Padua in earlier periods. What seems clear, however, is that Jewish students could not have flourished, indeed survived, without such supportive institutions. Moreover, the fact that Jewish graduates of Padua maintained lively social and intellectual liaisons with each other long after their departure from the university leads one to believe that such tangible support for future graduates was always forthcoming. The remarkable camaraderie among Jewish doctors and rabbis demonstrated by the celebration surrounding the Ḥamiẓ graduation is only one example of many. Equally telling is the special fellowship between Abraham ha-Cohen of Zante, Shabbetai Marini, and Solomon Lustro at the end of the seventeenth century [43]. Tobias Cohen's *Ma'aseh Tuviyyah* contains introductory approbations by colleagues and friends which also illustrate the social context of Jewish medical activity [44]. The life and social involvements of Isaac Vita ha-Cohen Cantarini of the seventeenth and early eighteenth centuries offer a similar and equally impressive example of support and liaison with other Jewish medical students and doctors as that of Solomon Conegliano [45].

The impression of social fellowship and mutual support among Jewish medical students before, during, and after graduation is strengthened even more by the disproportionate numbers of Jewish graduates stemming from the same family. Names like Delmedigo [46], Wallich [47], De Castro [48], Pardo [49], Cantarini [50], Cardoza [51], Morpurgo [52], Winkler [53], Maurogonato [54], Loria [55], Felix [56] and Conegliano [57], often appear among the graduates of Padua throughout the sixteenth, seventeenth, and eighteen centuries. In the cases of these individuals, educational, financial and social support was available from older family members who had undergone the same experience some years earlier. When this intricate web of social relationships is examined beyond the confines of Padua and Venice and even beyond Italy, one discovers similar bonds among Jewish graduates of Padua as colleagues, as teachers and students, as correspondents, and as cultural and intellectual allies in such cities all across Europe as Prague, Bingen, Frankfort, Hamburg, Cracow, and Salonika [58].

What ultimately emerges out of the simple fact that some 250

Jews graduated Padua's medical school in the early modern era is the evolution of a definable social and cultural group of Jewish intellectuals, almost all of them physicians, many of them rabbis as well, sharing a common university background, a common cultural heritage, common interests and values, linguistically and culturally assimilated, maintaining close contact among themselves, with other non-Jewish colleagues and with the upper echelons of Western and Eastern European society, maintaining in many instances an instable and itinerant lifestyle as well as a cosmopolitan and often restless spirit. Indeed, the term "scientific society", having a particular connotation and significance for seventeenth-century European culture, also might convey an approximate description of this emerging fraternity of Jewish medical graduates from Padua with other graduates of Spanish and Northern European universities [59]. Perhaps this Jewish network's membership ties were less formal than those of actual scientific societies, but they existed nevertheless. They were nurtured by an enthusiasm and commitment to science and enlightenment along with a growing antipathy and impatience for obscurantism and parochialism; they were reinforced also by a swelling resentment and antagonism among non-Jews throughout Europe towards the "ubiquitous" Jewish doctor [60]. For such disparaging recognition could easily be taken by Jews as an ethnic badge of honor. Had not Jews always been associated with a tradition of scientific and medical achievement [61]? The impressive collective accomplishments of Jewish physicians in recent times undoubtedly were a further acknowledgment of Jewish national honor. "Though scattered all over the world", writes one Jewish practitioner of the seventeenth century, referring to Jewish physicians, "they manage to maintain the unity and purity of their nationality [...] Since the time when the world was created, no other nation has thus preserved its strength and integrity" [62].

The impact of Padua's scientific ambience on Jewish culture is evident from the actual writings of the more prolific and illustrious of her Jewish graduates. That many of these compositions were published by Venetian presses – either in Hebrew or in Western languages – indicates a substantial cross-fertilization of culture between Paduan and Venetian Jewish societies. Most of these writings have yet to be studied systematically and in the wider context of general cultural developments. In the confines of this presentation, no full-scale treatment of all the major issues or most of the writers is possible. Utilizing, instead, a more limited sampling of the works of some of Padua's Jewish graduates, some preliminary observations are forthcoming.

The most striking feature about Jewish writers on scientific or medical subjects among Paduan graduates is that they demonstrate an impressive familiarity with scientific literature, both ancient and modern. This fact seems hardly unexpected in view of the greater availability of printed scientific texts by the sixsteenth and seventeenth centuries [63], and because of the coherent and exhaustive course of scientific study these writers undertook at Padua. Nevertheless, this knowledge explosion is vividly impressive when one observes the overwhelming number of cited sources in contrast to those of previous generations, the diversity of considered fields, the contemporaneity of cited authors, and the universality of interests discussed.

No doubt the most dramatic advances in early modern science are to be found in such physical sciences as mechanics, pneumatics, or astronomy. While references to the most outstanding of these achievements, particularly with respect to the heliocentric theories of the Copernican school, can be located in contemporary Jewish writing, they fail to convey the full impact of science on Jewish writing. For the most part, scientific experiments in these fields were undertaken outside the universities and were inaccessible to most Jews, with occasional exceptions. Yet most advances in medicine and its related fields were carried on primarily within the framework of universities like Padua. When viewed exclusively from the perspective of the physical sciences, the scientific culture of the university appears almost retrograde; seen however from the perspective of life sciences, the university's role in fostering scientific knowledge is in fact pivotal [64]. It is precisely in those same areas of science that the university fostered – medicine, botany, zoology, and mineralogy – that the Jews' overwhelming interest and accomplishment are to be located. A catalogue of reactions to Copernicus in contemporary Hebrew literature is thus a misleading guide for evaluating the degree of Jewish receptivity to the new science in the sixteenth and seventeenth centuries [65].

A more significant area in which such receptivity is readily apparent is that of the new chemical philosophy, that is, the new chemical and medical procedures associated with the Paracelsian school [66]. A number of the Jewish graduates of this period were markedly influenced by the chemical medicine of these Paracelsians or iatrochemists, apparently a vital strand of Padua's medical training by the end of the seventeenth century. The latter school was characterized by the union of chemistry and medicine; a contempt for ancient medical authority (particularly that of Galen and Aristotle); a new theory of disease which denied the Galenic system based on humours and cure by "contraries", which it replaced with a doctrine of cure by "similitude"; and most importantly, a search for

chemical analogies in the biological realm. By regarding chemical processes such as decomposition or distillation as keys for understanding nature as a whole, the Paracelsians offered a revolutionary perspective for understanding pathology and physiology, as well as a flood of new medical remedies, chemically derived from minerals and plants. Despite the rapid acceptance of the mechanical philosophy by the second half of the seventeenth century, the chemical philosophers never lost their enthusiastic adherents.

Of all the Jewish students at Padua, Tobias Cohen seems to have been the most attuned to the new chemical philosophy. Almost in revelatory terms, he announces in his *Ma'aseh Tuviyyah* the flowering "of a new medicine which dwells in the bosom of the physicians of our time" [67]. He regularly quotes the major exponents of this philosophy: Sylvius, Van Helmont, Sennert, Willis, Ertmuller, and more [68]. He often casts aspersions on Galenic medicine and presents the new chemists as a preferable alternative [69]. Like the seventeenth-century iatrochemists, he strongly opposes Galenic bloodletting and the Galenic explanation of fevers [70]. He is indebted especially to the Englishman Thomas Willis (1621-75), who ascribed the most frequent changes in nature to the process of fermentation. He even accepts the latter's rejection of the four elements in favor of five "principles", three active ones (spirit, sulfur and salt) and two passive ones (water and earth) [71].

In addition to Tobias, other Jews display the definite influence of the iathrochemists. David Nieto, in a long passage where he presents the conflicting philosophies of Descartes and Gassendi, also describes accurately the chemical philosophers, and even more revealingly, describes the same five principles of Willis [72]. Abraham Wallich quotes Sylvius, Willis, and Ertmuller [73], and Isaac Cantarini also is conversant with their writings [74]. Among Jewish physicians elsewhere in Italy and in the North, these Paduan graduates hardly were unique. Similar Paracelsian influences are found earlier in the sixteenth-century writings of Abraham Portaleone [75] and Abraham Yagel [76], and, among contemporary Jewish physicians, Isaac Cardoza [77] and Jacob Zahalon [78], to name only a few.

Such an abiding commitment to a philosophy of medicine whose founder had once vilified Jewish doctors might strike the modern reader with considerable irony. For in fact, Paracelsus had sought emphatically to overturn the idea that the Jews possessed a medical tradition superior to that of the Christians:

> As regards medicine the Jews of old boasted greatly, and they still do, and they are not ashamed of the falsehood [involved], they claim that they are the oldest and first physicians. And indeed they are the foremost among all the other nations, the foremost rascals, that is [...] He [God] also put a curse

on those who protect the Jews and who mix with their affairs, and yet they vindicate for themselves all praise of medicine. Let us pay no attention to all that, for if the Jews achieve anything in medicine they have not inherited it from their forefathers but have stolen it away from others, from strangers by robbery as it were [...] medicine has been given to the Gentiles and the Gentiles therefore we revere and praise, as the most ancient physicians [79].

Although the medical field at first may appear an odd setting to do battle with Jews, in the case of Paracelsus and his followers, it is more understandable, given the deeply religious overtones of the chemical philosphy. Paracelsus' search for natural knowledge was colored thorughout by a religious quest for God. For Paracelsus more than others, the search for divine "signatures" in nature, the quest for analogies and correspondences was connected intimately with understanding the Divine mystery. Indeed Paracelsus, Von Helmont, and other iatrochemists had promoted the notion that the physician's office was divine. Had not Ecclesiastes spoken of the Paracelsian *magus* and physician when he proclaimed: "Honor the physician for the need thou hast of him; for the Most High has created him" [80]? For such a researcher in his chemical search throughout the natural realm performed the pious duty of showing to mankind the infinite love of the Creator. Although so elevated a ministry was conceived for only pious Christians, the fusion of medicine, scientific inquiry and theology no doubt was an appealing proposition to sixteenth and seventeenth-century Jewish physicians as well [81]. They could ignore or repudiate Paracelsus' calumnies regarding Jewish medicine while soundly approving of so satisfying a rationale for their own professional and personal vocation. Could Solomon Conegliano have understood his calling any differently than that of Paracelsus and his followers when the physician-rabbi casually shifted from a medical text to a Talmudic tome in the classroom of his heralded academy?

Besides the chemical philosophy, the new atomistic theories of seventeenth-century science found their Jewish adherents as well. Joseph Delmedigo displays considerable familiarity with atomism, even identifying atoms with the kabbalist theory of "points" in the system of Isaac Luria, as understood by Israel Sarug [82]. David Nieto presents Gassendi's atomism as a viable alternative to either the iatrochemists or Descartes, although he ultimately rejects all three theories for the more reliable truths of the Torah [83]. Of all seventeenth-century Jewish writers, Isaac Cardoza, trained in medicine at Salamanca but also the father of the Paduan medical graduate, Jacob Cardoza, reveals the most intimate knowledge of recent atomistic theories, quoting a long list of contemporary atomists as well as Gassendi. While approving of the atomists who free themselves of "peripatetic slavery", he is careful to steer clear of their mechanistic

implications by strongly defending the concept of divine providence [84].

In the allied fields of botany and zoology, mineralogy and geography, these same writers also clearly demonstrate their competence and wide erudition. In the fifteenth and sixteenth centuries, Jewish scientific writers such as Yohanan Alemanno, Abraham Farissol, Abraham Yagel, Abraham Portaleone, David de Pomis and others had evinced particular interest in the spectacular, the peculiar, the irregularities of nature [85]. Their writings abound with descriptions of strange beasts and monsters, rare stones, and exotic plants. The seventeenth-century writers display similar proclivities; yet if there is any shift of emphasis, it lies in their growing analytic concern for describing the known rather than the mysterious. No doubt Isaac Cardoza still amuses his readers with digressions on monsters and unicorns just as David de Pomis earlier had relished the opportunity of discoursing on buffalo eggs [86]. Yet the later Paduan graduates seem to display more immediate and pragmatic concerns. Tobias Cohen is more inclined to focus on practical medical subjects – anatomy, embryology, pediatrics, pathology [87]. He has at his command a wealth of practical and theoretical knowledge which limited considerably any fanciful digressions from his primary goal – a coherent presentation of a medical textbook for the educated layman. A similarly pragmatic agenda, albeit more constricted in scope, is found in Abraham Wallich's *Harmonia Wallichia Medica* [88]. Jacob Ẓahalon's *Oẓar ha-Ḥayyim*, published in Venice, 1683, is designed along similar practical lines – to provide a useful medical encyclopedia for Jews who live in small towns where trained physicians are not always available [89]. Like Cohen's work, massive sections of Cordoza's *Philosophia libera* are practically orientated, leading the reader through informed discourses on biology, human anatomy and medicine.

Although less imposing, the knowledge of these Jewish savants in other scientific disciplines is hardly negligible. Cohen, Nieto and Cardoza are quite informed and indeed persuaded by the heliocentric theory, even though they ultimately reject it on theological grounds [90]. Delmedigo's relationship with Galileo and subsequent positive views of Copernicus already are well known [91]. Nieto accurately describes Descartes' mechanical philosophy [92]; Tobias Cohen also refers to Cartesian mechanics as well as Mersenne's experiments with air pressure [93]. Numerous other examples of scientific knowledge among Jewish writers, Paduan and non-Paduan graduates alike, are forthcoming but unnecessary to substantiate the indisputable fact that by the seventeenth century Jewish writers on science were conversant with all the major trends of contemporary science. Their scientific learning focused especially on the practicable, utilitarian areas of

medicine and its related fields. They were conscious of an explosion in knowledge and a radical improvement in medical treatment as a result, and they sought to convey their enthusiasm for these newly found techniques in both their Hebrew and Latin writings.

No doubt such unwavering commitment to the study of the new medicine and new science was bound to stir up longstanding anxieties within the Jewish community about the disproportionate amount of time expended on such studies and the potential displacement of the time-honored curriculum of Jewish learning by secular pursuits. Such concerns focused not only on the quantity of scientific study but also on its quality; ultimately a Jewish student prepared to invest five or more years of his education in non-traditional learning had opted for the priority of scientific over rabbinic learning. Certainly a prior grounding in rabbinic texts along with a restrengthening of traditional values through the agency of a Jewish supplemental school were useful in bolstering Jewish loyalties. But ultimately by entering Padua's medical school or other comparable institutions, students had chosen to pursue the secular at the expense of the holy. They eventually required strategies designed to help them adjust to so radical and educational dislocation, to legitimate scientific pursuits within the context of Jewish tradition and to promote the medical scientific profession within Jewish culture and society. Additionally there remained the external need to justify the increasingly conspicuous presence of Jewish physicians before unfriendly and even hostile colleagues in the European scientific and academic community.

The new Jewish scientific virtuosi already had at their disposal two venerable devices to achieve their purpose, one explicitly and the other implicitly located within the Jewish tradition itself. The first was to argue that scientific-physical pursuits, like philosophical-metaphysical ones, were endemic to Judaism from the time of Abraham or Solomon. According to this argument, science, with the emphasis either on medicine or astronomy, always was a Jewish discipline. The Hebrews had it first; they only lost it because of the trials and tribulations of their long exile [94]. If such sophistry appeared forced in light of the historical record, the major heroes of ancient science could be easily Judaised. Had not Aristotle or Plato studied with Jewish teachers [95]? Was no Moschus the Phoenician, the first atomist, indebted to a Jew for his knowledge [96]?

The second device was to legitimate the pursuit of scientific knowledge in religious terms, to construct a Jewish theology of medicine and science. Unquestionably the sources for such a theology were diffused richly throughout Jewish sources from the Psalmist to the rabbis and to the philosophers [97]. They also were available in

even more comprehensive form among contemporary Christian practitioners of science [98]. By highlighting the religious dimensions of studying nature, by arguing that the signs of nature lead ultimately to a better knowledge of God, and by insisting that medical and scientific study are no less than a religious duty, the growing breed of Jewish doctor-scientists not only vindicated themselves before their fellow co-religionists: they staked out a claim to a dominant leadership role within the Jewish community.

The first stratagem of appealing to a Jewish tradition of science was no more than a contemporary variation on the primary defense mechanism of Jewish cultural history [99]. Particularly in the era of the Renaissance, contemporary Jews, undoubtedly flattered by the newfound Christian interest in their cultural heritage, were quick to point out that Israel was the font of all learning; the "Renaissance" was a return to their own national treasures no less than those of Greece or Rome [100]. If Neoplatonism, Hermetic magic, or Ciceronian rhetoric could be Judaised by Renaissance Jewish writers, why not science as well? In fact, the latter task was made easier by the prominence of so many outstanding scientists among the luminaries of the Jewish cultural past, from Maimonides to Gersonides to Ibn Ezra and Zacuto. By the prominent place these earlier giants had given to science, they already had validated its pursuit for their eventual successors. Prior to them, both the rabbis and even earlier heroes of the Biblical past supposedly had paved the way for a Jewish appreciation of scientific endeavor. Thus David Nieto argued that "the source of the sciences went out from us and our holy Torah includes them all" [101]. Abraham, Job and Solomon all were knowledgeable about nature; the rabbis demonstrated expertise in geography, engineering, medicine and surgery as well [102]: "Behold our sages certainly have an advantage of some 1500 years in their knowing [science] what the moderns still do not know at present" [103]. Nieto qualifies this generalization by conceding that the rabbis' knowledge was imperfect because they mastered only what was critical to understand the Torah [104]. Similarly in the field of astronomy "it already is known" writes Tobias Cohen "that our sages tried harder than the Gentile scholars to know and understand the wisdom of astronomy [...] And thus the words of the Torah and sciences were mixed and diffused among Israel throughout the duration of the first and second Temples and then arose the spirit of the Babylonians, Persians, Greeks, and Romans to learn from them, to exchange [knowledge] about the science of the spheres as well as other sciences" [105]. Even Joseph Delmedigo, who laments the inferior status of science in the conventional curriculum of contemporary Jews, acknowledges, at the very least, the existence of a Jewish scientific

tradition, "one in a city, two in a state, who represented a powerful support for the house of Israel", men like Saadia Gaon, Abraham Bar Hiyya, Abraham Ibn Ezra, Isaac Israeli, Moses Almosnino, David Gans, and others [106].

The argument for a tradition of Jewish science also is unequivocal in the apologetic literature of contemporary Jewish doctors writing in Latin. Isaac Cardoza argues that Abraham and Joseph taught the Egyptians mathematics, that Solomon's scientific knowledge was second to none, and even that atomism was of Jewish origin [107]. Both David de Pomis and Benedict de Castro would have concurred fully with Paracelsus' remark regarding the Jewish claim that they are the first physicians. De Pomis unabashedly declares in his *De Medico Hebraeo*, published in Venice in 1588, that medicine was first discovered among the Jews and only later was revealed to the Gentiles. His list of illustrious Jewish physicians includes both the medieval doctors, Ibn Ezra, Gersonides and Maimonides, as well as contemporaries, Abraham de Balmes and Joseph Delmedigo. To this he adds additional lists of distinguished Jewish physicians in France and Turkey [108]. For de Castro, it was God who conceded to the Jews the privilege of medical practice as their hereditary right:

> Moses, the most famous of all legislators [...] was the one who laid the foundation of medicine as the most conspicuous of all arts [...] Solomon the wise [...] left an exhaustive history of healing plants [...] But why need I dwell on that when there is virtually no part of medicine which cannot be traced to the Hebrew forefathers [109]?

For him, the crowning achievements in Jewish medicine, however, are reserved for his own time – those of the Converso physicians "scattered all over the world" as well as the "numerous Jews engaged in medicine all over Holland, Brabant, Gaul, Italy and Germany" [110].

A theological claim accompanied the historical rationale for legitimizing scientific endeavor among contemporary Jews. The materials for constructing such a theology were readily available within Biblical and post-Biblical writing; Christian writers on science regularly had employed similar arguments in affirming their religious motives for scientific pursuit [111]. Thus Jewish writers declared that the acquisition of scientific knowledge constituted a kind of natural revelation. The more the scientist discovered the natural world around him, the more he confirmed his religious beliefs. It became, accordingly, a religious duty to study nature since by ignoring the manifestations of God's glory in nature, one robs the Creator of some of His glory. Of course, such pious demands for scientific involvement unconsciously assumed that nature was no more than an extension of God's providence. When decoded, the multifarious forms of nature

would reveal, in their magnificent splendor, a total pattern of divine harmony, and that nature only would divulge its benevolent side. These Jews based such prior convictions on the unshakable belief in God's infinite goodness [112]. Nevertheless, whatever its logical inconsistencies, such an argument functioned more than adequately as a satisfying rationalization for Jewish doctor-scientists to view their medical pursuits within the safe confines of Jewish tradition itself. Thus Jacon Ẓahalon set the proper tone in authenticating his professional activity through his well known physician's prayer: "I pray [...] that I may discover the secrets of thy wonderful deeds and that I may know the peculiar curative powers which Thou hast placed in herbs and minerals [...] and that through them I shall tell of Thy might to all generations to whom Thy greatness shall come" [113]. Similarly David Nieto proclaims: "There is not a single creature, even among the least of them, that does not show in some form of its constitution the impress of God" [114]. Even Joseph Ḥamiẓ who eventually turned from scientific to mystical study, could still acknowledge: "One must understand natural things in order to know what is beyond nature [...] for one must look at heaven to see what is considerably higher than nature, that there exists a leader and organizer of nature regarding every particular thing" [115]. In like fashion, Joseph Delmedigo extols the purposefulness of natural phenomena, the wonders, of such seemingly insignificant oddities as roots, seeds, or spiders [116]. Elsewhere, he concludes: "Contemplating every one of [God's] creatures leads man to recognize his exalted Creator and to praise the Master and Cause of everything good, since 'from our flesh, we shall see God' (Job 19:26) our Maker and glorify him since all of 'His judgments are like the great deep' (Psalms 36:7)" [117]. Perhaps the most felicitous description of the Jewish doctor-scientist's calling was penned by Isaac Cardoza: "We shall investigate nature and its founder, so that from the world and its multitude of things, as if by a ladder, with enlightened and instructed mind, we may be lifted to God its maker; for his creatures are the ladder by which we ascend to God, the organ with which we praise God, and the school in which we learn God" [118].

The reassuring coincidence that so many physicians were also rabbis no doubt was confirmation of the underlying spirituality of the doctor's role. Thus Ẓahalon would remind his readers that "most of the doctors in Israel are masters of the Torah and Godfearers" [119]. The curriculum of Solomon Conegliano's preparatory academy assuredly confirmed this observation. Moreover for Isaac Cardoza, the integration of the physician's "truths" with those of the theologian was not fortuitous; on the contrary, it was deliberate and constituted the ultimate objective of the Jewish physician: "For it behooves the

philosopher to handle both, that is, the human things, and the divine, so from the visible to the invisible, from the perishable to the immortal, from the temporal to the eternal, we may train, uplift and kindle the mind" [120].

Here then lay the most compelling argument in favor of the medical profession: to contemplate the visible world or to ruminate over a rabbinic text were essentially equivalent activities. Deciphering the signs of God's marvelous presence in the pages of a sacred literary document or in the operations of natural processes were extensions of the same Jewish imperative: to celebrate God's majesty and to sing praises of his manifold works. Cardoza and his colleagues presumably had succeeded, as Paracelsus and his disciples before them, in suppressing any apparent strains between the demands of their mundane and divine vocations. What greater assurance could a Jewish student be offered in choosing a medical and scientific career than to be told that the dramatic discoveries in his anatomy class were substantively no less uplifiting from a religious point of view than the most ingenious subtleties of a Talmudic discourse [121]!

Such historical or theological apologia could not conceal for long the inevitable incongruity between scientific research and conventional modes of Jewish study. Unquestionably the Jewish anatomy student eventually came to appreciate the qualitative difference between scientific and traditional methodologies of learning. No doubt Joseph Delmedigo's preference for engineers and builders over "academicians with their endless disputations, which only distract people from their useful pursuits", was symptomatic of a change of heart in more than one Jewish graduate of a medical school [122]. So too was his unqualified resentment for those rabbis of his day who failed to understand anything "on the subject of the sphere and its construction just as the goat or ass fail to understand" [123]. Such religious leaders, in Delmedigo's estimation, were culpable of breaking an eternal covenant and rebelling against the prophet's word: "Look at the Heavens and see who created these" [124].

Delmedigo's sarcasm stands in sharp contrast with the pious affirmations of those who naively believed that the methods of the rabbis and those of the scientists were indeed the same. As Delmedigo transparently acknowledged, they were not only the same; the latter was often superior to the former. The education of non-Jewish children in the natural sciences was far better than that of Jewish children. "Is this the Torah which Moses placed at the head of the nations [...] which is the tree of life to those who grasp it [...]?", Delmedigo tauntingly asks [125]. His scornful question undoubtedly discloses the shattering consequences intense scientific study could hold

for at least one Jewish university graduate on the threshold of the modern era.

Delmedigo's Jewish inferiority complex was perhaps the most palpable among his Jewish contemporaries but hardly an isolated case of Jewish cultural insecurity. David Nieto, notwithstanding his arsenal of arguments to demonstrate the credibility of rabbinic over scientific truths, is forced ultimately to admit that the rabbis' knowledge was incomplete since there was no necessity for them to be "learned or surgeons or astronomers or doctors [...] It was sufficient that they master these disciplines [only] as completely as required in order to understand our holy Torah" [126]. Tobias Cohen's motivation in writing his Hebrew medical compendium is inextricably bound up with a deep-seated feeling of cultural inferiority, nurtured especially by the unpleasant experiences of his student days in Germany prior to coming to Padua. He writes in order to respond to the Gentiles:

> who vex us, raising their voices without restraint, speaking haughtily with arrogance and scorn, telling us we have no mouth to respond, nor a forehead to raise our heads in matters of faith and that our knowledge and ancient intelligence have been lost, as I heard the slander of many from the surrounding den during the days of my youth. The truth of the matter is that because of our many sins men of learning are lost and we have no one who knows how to answer the doubters who abuse us with an appropriate winning response [...] [127].

When David de Pomis earlier called for the study of science among his co-religionists ("for it raises the lowly, frees those despised and in bondage, and secures respect and honor"), he assuredly shared his colleague's lack of confidence in the enduring vitality and integrity of traditional Jewish culture [128]. Regardless of both Cohen's and de Pomis' pious affirmations of a proud and time-honored scientific tradition within Judaism, they reveal at the same time unmistakable feelings of inadequacy. The contest between science and Jewish tradition had left its shattering mark on the cultural sensibilities of Jews like Cohen, Nieto, Delmedigo, and many others in Padua and elsewhere. The demonstrative assurance of earlier Italian Jews regarding the adequacy of their own cultural legacy was no longer self-evident to their successors [129]. The results of the new scientific explosion were imposing, and they no longer could be explained away solely by appeals to the grandiose cultural achievements of an ancient past. The emerging sense of Jewish inferiority among such impressionable Jewish observers of enlightened Christian society would become a propensity for an increasing number of university educated Jews in subsequent years [130].

A diminished confidence in the modes of Jewish education was

one thing; an uncertainty regarding some of the cardinal principles of Jewish faith was quite another. The basic compatibility between science and Judaism had appeared axiomatic to the early Jewish practitioners of science; to their successors, it increasingly was fraught with difficulties. No less immune than their Christian counterparts to the formidable challenges science ultimately presented to religious faith, Jewish scientific writers soon learned to appreciate that their naive belief in the congruence of the two systems of truth was often unreliable [131].

Jewish writers on medicine and science had proposed most often arguments from the design and order of the universe to demonstrate the supposed affinity between science and belief in one God. As we have seen, such arguments could bolster, on the one hand, their prior convictions that the more they knew of the universe, the more they were capable of glorifying God. On the other hand, these claims also tended to obscure the potential complication that when God is seen exclusively as a reflection of nature, He might easily be mistaken for nature itself. With such emphasis on arguments from design, proof of God's existence based on the subjective historical experience of the Jewish people often assume a minor or even negligible role [132]. Moreover, the idea of divine providence over all individual creatures is passed over in favor of an immanent and natural causality.

This is not the place to examine in detail the theological implications of this more than subtle shift in emphasis in speaking about God among these same Jewish writers. Suffice it to say they are quite sensitive to the serious obstacles these new formulations might pose for the Jewish faith. Tobias Cohen, for example, writes:

> there exist weak minded men of deficient intelligence and understanding not only from among the Gentile nations who never observed the light of the Torah but also among the members of our people, the nation that walks in the darkness of the exile and the light of the Torah [...] and they think that the world has no originator or creator or leader but only that everything is determined by nature and its custom. Some of them are skeptical of this matter and doubt it, among them believers and non-believers [...] [133].

Joseph Delmedigo, in discussing the issue of divine providence, is no less explicit: "Some philosophers thought that nature is equivalent to God Himself because His works were wondrous in their eyes" [134]. Isaac Cardoza speaks more innocently about God being "a universal axiom of nature" [135]. However David Nieto has no illusion about the pitfalls of such formulations. Because of his own attempt to define the Jewish concept of God as identical with nature, he finds himself embroiled in a heated theological controversy, even accused of pan-

 theistic proclivities. No doubt he composed his entire treatise, *On*

Divine Providence, in the context of similar English and continental theological discussions regarding the dangerous implications of the new science [136].

No less troubling for these men were the apparent points of friction between the authority of scientific hypotheses and that of sacred tradition [137]. The Copernican theory was the most obvious and dramatic case in point. Here the sheer logic and rationality of the heliocentric position was pitted against the utter weight of Biblical authority. Among Jewish discussants of Copernicus, Tobias Cohen and David Nieto disclose most transparently their personal dilemma in assuming a stance that violates neither their rational nor their religious sensibilities. While both writers eventually opt for a conservative Biblicist position, there is more to their convoluted discussions than initially meets the eye. Neither of them is overly impressed by the weight of the Aristotelian position [138]. Nieto openly disparages those who blindly adhere to the Peripatetic teachings [139]. Both are noticeably swayed by the refreshing consistency and utterly simple arguments against the Ptolemaic universe which they present to their readers with little or no refutation at all. Tobias may caustically label Copernicus "the first born of Satan", but more revealingly, he offers no resistance to six cogently argued Copernican demonstrations other than limply stating: "These are the proofs that the teachers, according to Copernicus' view, would teach; however the counter-arguments are easily confusing [even] to one who understands [them]: thus I will not dwell on them anymore" [140].

Additional theological hurdles arose not only regarding the position of the Earth but also its unique status in a universe of seemingly infinite scope. The idea of a divinely ordered world, its harmony and proportion, had been traditionally tied to a finite universe. This proposition naturally led to the unique status of the Earth, the centrality and unique moral purpose of the Earth's creation, and the image of man as the master of that creation [141]. For Jews, the special vocation of their chosen status and the singular revelation of the Torah seemed considerably undermined if not debilitated altogether by the notion of infinitely inhabitated worlds. Fully aware of the various strands of the seventeenth-century debate, Cohen, Nieto, and Delmedigo surprisingly offer no serious opposition to this revolutionary concept. Nieto is unoffended by the notion of the plurality of worlds since it fails to contradict any Biblical verse [142]. Cohen remains comfortably neutral, offering his readers five arguments in favor and five against plurality [143]. Delmedigo waxes eloquently about his personal delight in realizing that the world's plurality leads ineluctably to a heightened appreciation of the Creator Himself [144]. Cardoza alone firmly objects to the concept of many worlds. Many

worlds imply many creators while "unus Deus unum mundum creavit" [145].

Not one of the encomiasts who participated in Joseph Ḥamiẓ's celebrated college graduation could have fully anticipated the rich symbolism of so seemingly modest an occasion. For Padua offered Jews like Ḥamiẓ more than the limited opportunity of acquiring technical knowledge. It afforded them a radically novel learning experience, a new basis for sociability with non-Jews, and a unique environment for cultivating different, often conflicting, values. It provided them a stage, a forum for wrestling with the inevitable tensions of living a Jewish life in a dramatically changing social and intellectual universe. They had entered merely to study medicine; they came out thoroughly transformed human beings. The story, sketched here of Ḥamiẓ and his contemporaries, only in preliminary fashion on the basis of limited data, requires considerably more attention. More graduates deserve their own biographers – studies of their life experiences, their tribulations and their attitudes shaped in the formative years of their education and professional careers. Such a nuanced investigation of Jewish scientific figures, emerging, to a great extent, at Padua under the aegis of the government of the Veneto, undoubtedly will contribute to a greater appreciation of the process of intellectual and social integration of early-modern Jews in Western and Eastern Europe [146].

Meir Benayahu perceptively reminds us to examine carefully the actual portraits of the Jewish doctors he has studied – Abraham Cohen of Zante, Shabbetai Marini, and Solomon Lustro [147]. They, like their illustrious contemporaries Tobias Cohen and Joseph Delmedigo, flattered themselves by having their own images printed on the opening leaf of their published writings. How stately, how solemn, how pretentious, and how "non-Jewish" they appear in their formal medical attire! Who would doubt that underneath the composed external appearance of each of these gentlemen lies an inner world of variegated and edifying life experiences, of intellectual ferment, of cultural strains and agitations, and perhaps even of psychological turmoil, a world not unlike that of subsequent generations of Jews striving to enter modern European society?

Notes

1 A. Modena and E. Morpurgo, *Medici e chirughi ebrei dottorati e licenziati nell'Università di Padova dal 1617 al 1816*, ed. by A. Luzzato, L. Münster and V. Colorni, Bologna 1967, p. 8.

2 On Padua's medical school in the sixteenth and seventeenth centuries, see G. Whitteridge, *William Harvey and the Circulation of the Blood*, London-New York 1971; C.B. Schmitt, *Science in the Italian Universities in the 16th and Early 17th Centuries*, in M. Crosland (ed.), *The Emergence of Science in Western Europe*, New York 1976, pp. 35-56; Id., *Philosophy and Science in 16th Century Universities: Some Preliminary Comments*, in J.E. Murdoch and E.D. Sylla (eds.), *The Cultural Context of Medieval Learning*, Dordrecht 1975, pp. 485-537; J. Bylebyl, *The School of Padua: Humanistic Medicine in the Sixteenth Century*, in C. Webster (ed.), *Health, Medicine and Mortality in the Sixteenth Century*, Cambridge 1979, pp. 335-70; C. Fichtner, *Padova e Tubingen: la formazione medica nei secoli XVI e XVII*, "Acta Medicae Historiae Patavina", XIX (1972-73), pp. 43-62. See also the articles of F.D. Derroussiles, G. Ongaro and C. Maccagni in G. Arnaldi and M. Pastore Stocchi (eds.), *Storia della cultura veneta: dal primo Quattrocento al Concilio di Trento*, III, Vicenza 1980, sections 2 and 3. References to the earlier standard works on Padua's university are found in these articles. On Jewish students at Padua, see C. Roth, *Venice*, Philadelphia 1930, pp. 285-93; V. Colorni, *Sull'ammissibilità degli ebrei alla laurea anteriormente al secolo XIX*, in *Scritti in onore di Riccardo Bachi*, Città di Castello 1950; G. Kisch, *Cervo Conigliano: A Jewish Graduate of Padua in 1743*, "Journal of the History of Medicine", 4 (1949), pp. 450-59; J. Shatzky, *On Jewish Medical Students of Padua*, "Journal of the History of Medicine", 5 (1950), pp. 444-47; H. Friedenwald, *The Jews and Medicine*, 2 vols., Baltimore 1955, I, pp. 221-40, 253-58; A. Ciscato, *Gli ebrei in Padova (1300-1800)*, Padua 1901; D. Kaufmann, *Trois docteurs de Padoue*, "REJ", 18 (1889), pp. 293-98; M. Soave, *Medici ebrei laureati nell'Università di Padova nel 1600 e 1700*, "Il Vessillo Israelitico", 24 (1876), pp. 189-92. I was unable to consult J. Warchal, *Jan. Zidzi polscy na Universytecie padevskim*, "Kwartalnik poświecony badaniu przeszlości Żidóm w Polsce", Warsaw 1913, I, n. 3, pp. 37-72. Beside the list of Jewish students located in Modena and Morpurgo, *Medici e chirughi ebrei*, cit., see now, for the sixteen century, E. Veronese Ceseracciu, *Ebrei laureati a Padova nel Cinquecento*, "Quaderni per la storia dell'Università di Padova", 13 (1980), pp. 151-68. Additional bibliography is mentioned in the works above and see also below.

3 The collection is entitled *Belil Hamiz* and was printed in Venice in 1624. It is reprinted in N.S. Leibowitz, *Seridim Mikitve ha-Pilosof ha-Rofe ve-ha-Mekubbal R. Yosef Hamiz*, Jerusalem 1937, pp. 35 ff.

4 Benjamin Mussafia graduated from Padua a year later in 1625 (Modena and Morpurgo, *Medici e chirughi ebrei*, cit., p. 10). On Mussafia, see D. Margalit, *Hokhme Yisra'el Ke-Rofim*, Jerusalem 1962, pp. 142-51.

5 On Azariah Figo, see A. Apfelbaum, *R. Azariah Figo*, Drohobycz 1907. Compare Figo's critique of "gentile" learning discussed by Y. Yerushalmi, *From Spanish Court to Italian Ghetto*, New York 1971, pp. 373-74.

6 J. Schudt, *Jüdische Merekwürdigkeiten*, Frankfort on the Main 1714-18, II, p. 404, described in Friedenwald, *The Jews and Medicine*, cit., I, pp. 227-28.

7 See the bibliography in note 2 above.

8 See Warchal's article mentioned in note 2 as well as N.M. Gelber, *On the History of Jewish Doctors in Poland in the 18th Century* in *Shai le-Yishayahu* (*Jubilee Volume in Honor of Isaiah Wolfsberg*), Tel Aviv 1956, pp. 347-71; G. Kisch, *Die Prager Universität und die Juden 1348-1848*, Mährisch-Ostrau 1935.

[9] On Jewish medical students at the University of Leiden, see J. Kaplan, *Jewish Students from Amsterdam at the University of Leiden in the 17th Century*, in *Meḥkarim al Toledoth Yahadut Holland*, Jerusalem 1979, pp. 65-75 (in Hebrew).

[10] The standard works on the history of Jewish physicians include the aforementioned writings of Friedenwald and Margalit; M. Steinschneider, *Jüdische Aerzte*, "ZHB", 17 (1914), pp. 63-96, 121-68; 18 (1918), pp. 25-57; I. Münz, *Die Jüdische Ärzte in Mittelalter*, Frankfurt on Main 1922; E. Carmoly, *Histoire des médecins juifs anciens et modernes*, Brussels 1844; R. Landau, *Geschichte der Jüdischen Ärzte*, Berlin 1895; S. Krauss, *Geschichte der Jüdischen Ärzte*, Vienna 1930; and S.R. Kagan, *Jewish Medicine*, Boston 1952. See also S. Goitein, *The Medical Profession in the Light of the Cairo Genizah Documents*, "HUCA" 34 (1963), pp. 177-94.

[11] See the works listed in the previous note, as well as Colorni, *Sull'ammissibilità*, cit.; C. Roth, *The Qualification of Jewish Physicians in the Middle Ages*, "Speculum", 28 (1953), pp. 834-43; D. Carpi, *R. Judah Messer Leon and His Activity as a Doctor*, "Michael", I (1973), pp. 277-301 (in Hebrew).

[12] Cf. Shatzky, *On Jewish Medical Students*, cit., p. 446; on the "nations", see P. Kibre, *The Nations in the Medieval Universities*, Cambridge (Mass.) 1948.

[13] For documentation regarding these conclusions, see below.

[14] Cf. Skatzky, *On Jewish Medical Students*, cit., p. 444; Gelber, *On the History of Jewish Doctors*, cit., p. 351; N. Shapiro, *The Natural Sciences and Mathematics as Pathfinders for the Haskala Movement*, "Koroth", 2 (1958), pp. 319-44 (in Hebrew).

[15] Bylebyl, *The School of Padua*, cit., p. 342-43; O. Logan, *Culture and Society in Venice 1470-1790*, London 1972, pp. 20-21, 46-47.

[16] From 1617 to 1816, the names of all Jewish graduates are listed in Modena and Morpurgo, *Medici e chirurghi ebrei*, cit.; L.A. Schiavi, *Gli ebrei in Venezia e nelle sue colonie. Appunti storici su documenti editi ed inediti*, "Nuova antologia", s. III, 47 (1893), p. 333 was the first to maintain that 80 Jews graduated the university between 1517-1619 and he was followed by all subsequent authors. For further clarifications regarding this number see the article of Veronese Ceseracciu mentioned in note 2 above.

[17] On Delmedigo, see I. Barzilay, *Yoseph Shlomo Delmedigo, Yashar of Candia: His Life, Works, and Times*, Leiden 1974.

[18] On Ḥamiz, see *Encyclopedia Judaica*, VII, coll. 1239-40 and the bibliography listed there and see note 3 above.

[19] On Cohen, see Carmoly, *Histoire des médecins juifs*, cit., pp. 247-51; A. Levinson, *Tuviyyah ha-Rofe ve-Sifro Ma'aseh Tuviyyah*, Berlin 1924, and see below.

[20] On Nieto, see J.L. Petuchowski, *The Theology of Haham David Nieto: An Eighteenth-Century Defense of the Jewish Tradition*, New York 1954, reprint 1970; I. Solomons, *David Nieto and Some of His Contemporaries*, "JHSET", 12 (1931), pp. 1-101, and see below.

[21] On the Coneglianos, see D. Kaufmann, *Dr. Israel Conegliano und seine Verdienste um die Republik Venedig bis nach dem Frieden von Carlowitz*, Budapest 1895; on Solomon, see T. Cohen, *Ma'aseh Tuviyyah*, Venice 1707, pp. 5a-b, 93a.

[22] On Isaac Cantarini, see M. Osimo, *Narrazione della strage compiuta nel 1547 contro gli ebrei d'Asolo e cenni biografici della famiglia Koen-Contarini*, Casale Monferrato, 1875, pp. 67-93; H.A. Savitz, *Dr. Isaac Hayyim ha-Cohen Contarini*, "The Jewish Forum", 43 (1960), pp. 80-82, 99-101, 107-8.

[23] See the references in note 2 above.

[24] See C.M. Cipolla, *Public Health and the Medical Profession in the Renaissance*, Cambridge 1976, pp. 67-116; Bylebyl, *The School of Padua*, cit., p. 336.

[25] See note 15 above.

[26] See especially Fichtner, *Padova e Tubingen*, cit., who refers to Thomas Bartholin's work, *De peregrinatione medica*, Hafniae 1674.

[27] The description of Padua's curriculum and social setting that follows is based on the works of Bylebyl, Whitteridge, and Schmitt cited in note 2 above. See also, J.P. Tomasini, *Gymanisum Patavinum*, Udine 1645; J. Facciolati, *Fasti Gymnasii Patavini*, 3 parts in 1, Padua 1757; A. Favaro, *Atti della nazione germanica artista nello Studio di Padova*, 2 vols., Venice 1911-12; S. de Renzi, *Storia della medicina in Italia*, 5 vols., Naples 1845-48; H.F. Rashdall, *The Universities of Europe in the Middle Ages*, 3 vols., 2nd ed., ed. by M. Powicke and A.B. Emden, Oxford 1936; P.O. Kristeller, *Philosophy and Medicine in Medieval and Renaissance Italy*, in S.F. Spicker (ed.), *Organism, Medicine and Metaphysics*, Dordrecht 1978, pp. 29-40; A. Favaro, *Saggio di bibliografia dello Studio di Padova*, Venice 1922, and "Quaderni per la storia dell'Università di Padova", Padua 1968 ff.

[28] L. Münster, *Die Anfänge eines klinischen Unterrichts an der Universität Padua in 16. Jahrhundert*, "Medizinische Monatsschrift", 32 (1969), pp. 171 ff.; F. Pellegrini, *La clinica medica padovana attraverso i secoli*, Verona 1939.

[29] On the latter, see below.

[30] E.H. Underwood, *The Early Teaching of Anatomy at Padua with Special Reference to a Model of the Padua Anatomical Theatre*, "Annals of Science", 19 (1963), pp. 1-26.

[31] A. Favaro, *I lettori di matematiche nell'Università di Padova dal principio del secolo XIV alla fine del XVI*, "Memorie e documenti per la storia dell'Università di Padova", I (1922), pp. 1-70.

[32] Kibre, *The Nations*, cit., pp. 43, 116 ff.; Favaro, *Atti della nazione germanica*, cit.; Cipolla, *Public Health and the Medical Profession*, cit., pp. 6-7; *Omaggio dell'Accademia polacca all'Università di Padova*, Cracow 1922.

[33] Ciscato, *Gli Ebrei in Padova*, cit., p. 209; Moses Vital Cantarini composed a treatise on the problem of using Jewish corpses for dissections. See "Hebraische Bibliographie", 16 (1874), p. 37.

[34] On this, see B. Kisch, *Cervo Conigliano*, cit., pp. 457-59; Ciscato, *Gli Ebrei in Padova*, cit., pp. 213 ff.; Friedenwald, *The Jews and Medicine*, cit., I, pp. 226-27.

[35] Cohen, *Ma'aseh Tuviyyah*, cit., p. 93a.

[36] J. Delmedigo, *Sefer Elim*, Odessa 1864-67, p. 63. Compare this remark with a similar traditional concern discussed in M. Idel, *On the history of the Inderdiction Against the Study of the Kabbalah Before the Age of Forty*, "AJSR", V (1980), pp. 15-20 (in Hebrew).

[37] Delmedigo, *Sefer Elim*, cit., p. 92.

[38] Provincial's proposal is found in S. Assaf, *Toledot ha-Hinukh be-Yisra'el*, 4 vols., Jerusalem 1939-43, II, p. 118. Also quoted in R. Bonfil, *Ha-Rabbanut be-Italya bi-Tekufat ha-Renasans*, Jerusalem 1979, p. 124.

[39] Leibowitz, *Seridim*, cit., pp. 44-45.

[40] Cohen, *Ma'aseh Tuviyyah*, cit., p. 93a.

[41] *Ibid.*

[42] On Conegliano and his school, see note 21 and Kaufmann, *Trois Docteurs*, cit.

[43] See M. Benayahu, *R. Abraham ha-Cohen of Zante and the Group of Doctor-Poets in Padua*, "Ha-Sifrut", 26 (1978), pp. 108-40 (in Hebrew).

[44] Cohen, *Ma'aseh Tuviyyah*, Introductions.

[45] He is discussed by M. Benayahu (note 43 above) as well as in the works cited in note 22 above. See also his correspondence with Christian Theophil Unger published by S.D. Luzzato in "Oẓar Neḥmad", 3 (1860), pp. 128-50 as well as his other books and letters discussed by Osimo and Savitz.

[46] Abba di Elia Delmedigo (graduated 1625, and brother of Joseph); David Vita di Donato Delmedigo (1655); Joseph Isaiah di Jacob Delmedigo de Dattolis (1677); Abramo Delmedigo (1683); Emmanuel di Jacob Delmedigo de Dattolis (1686). On Joseph, see note 17 above.

[47] Lazzaro Wallich (1626); Abram Wallich (1655); Isaac Wallich (1683); Leone di Abram Wallich (1692); Hirsch di Abram Wallich (1692); Jacob Wallich (1722).

[48] Daniel di Rodrigo De Castro (1633); Ezekiel alias Pietro di Isacco alias Lodovico De Castro (1645); David di Abram De Castro (1700). See also Friedenwald, *The Jews and Medicine*, cit., II, pp. 452-53.

[49] Daniel di Abram Pardo (1624); Abram di Daniel Pardo (1646). See also L. Della Torre, *La famiglia Pardo*, in *Scritti sparsi*, Padova 1908, II, pp. 251-56.

[50] Clemente di Simone Cantarini (1623); Leon di Simone Cantarini (1623); Simon Cantarini (1654); Isaac Vita di Jacob Isacco Cantarini (1664); Vidal Moise di Angelo Cantarini (1686); Angelo di Vidal Moise Cantarini (1697); Grassin di Samuel Vita Cantarini (1703); Angelo di Grassin Cantarini (1705); Joseph di Simon Cantarini (1718); Angelo di Simon Cantarini (1722); Simon di Grassin Cantarini (1730); Vidal Cantarini (1748). See also note 22 above.

[51] Jacob Cardoza, son of the distinguished Isaac Cardoza, graduated in Padua in 1658. See Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., on Isaac.

[52] David di Shemaria Morpurgo (1623); Aron Morpurgo (1671); Marco Morpurgo (1694); Samson di Salvador Moise Morpurgo (1700); Mario Morpurgo (1747); Moise Raffael di Jacob Morpurgo (1768); Joseph Morpurgo (1805). See also E. Morpurgo, *La famiglia Morpurgo di Gradisca sull'Isonzo (1585-1885)*, Padua 1909.

[53] Leo di Isacco Winkler (1629); Jacob di Leo Winkler (1669); Isacco di Leo Winkler (1699); Wolff di Jacob Winkler (1701). See D. Kaufmann, *Hundert Jahre aus einer Familie Jüdischer Aerzte – Dr. Leo, dr. Jakob, dr. Isak, dr. Wolf Winkler*, "Allegemeine Zeitung des Judentums", 52 (1890), pp. 468-71 (reprinted in *Gesammelte Schriften*, Frankfort on the Main 1915, III, pp. 286-95).

[54] Eleazoro di Sabbato Maurogonato (1620); Elia di Sabbato Maurogonato (1620); Jacob di Sabbato Maurogonato (1629); Geremia Maurogonato (1633); Sabbato Maurogonato (1678); Geremia di Sabbato Maurogonato (1708); Samuel di Sabbato Maurogonato (1708).

[55] David Loria (1623); Isacco di David Loria (1653); David Vita di Isacco Loria (1696); Constantino di Josue Loria (1740).

[56] Vitale di Moise Felix (1658); Gabriel di Moise Felix (1683). On the latter's relationship to Tobias Cohen, see Kaufmann, *Trois Docteurs*, cit.; on his relationship to Yair Bachrach, see D. Kaufmann, *R. Jair Chajim Bachrach (1637-1702) und seine Ahnen in Worms*, Treviri 1894.

[57] Salomon di Giuseppe Conegliano (1660); Israel di Giuseppe Conegliano (1673); Abramo Joel di Israel Conegliano (1686); Joseph di Leon Conegliano (1688); Joseph di Israel Conegliano (1703); Aron Conegliano (1707); Issachar di Israel Conegliano (1710); Zevulun di Israel Conegliano (1716); Naftali di Giuseppe Conegliano (1743); Beniamino di Moise Conegliano (1766); Giuseppe Conegliano (1774); Salomon di Naftali Conegliano (1775); Amadeo Conegliano (1783). See also note 21 above.

[58] This is not the place to document fully so broad a generalization. Yet merely a study of the origins and points of return of graduates listed by Modena and Morpurgo will yield numerous cross-references to each of these places, among others. See also Gelber, *On the History of Jewish Doctors in Poland*, cit.; G. Kish, *Die Prager Universität*, cit.; D. Kaufmann, *Ein Jahrhundert einer frankfurter Aerzte-familie*, "Monatschrift für Geschichte und Wissenschaft des Judentums", 41 (1897), pp. 128-33 (reprinted in *Gesammelte Schriften*, cit., III, pp. 296-301); J. Elbaum, *Zeramim u-Magamot be-Sifrut ha-Maḥshavah ve-ha-Musar be-Ashkenaz u-ve Polin be-Ma'ah ha-16*, unpublished Ph. D. dissertation, Hebrew University, 1977, ch. 9; J. Leibowitz, *On the History of Jewish Doctors in Salonika*, *Sefer Yavan*, I (= *Sefunot* 11), Jerusalem 1971-77, pp. 341-51 (in Hebrew); J. Nehama, *Les médecins juifs à Salonique*, "RHMH", 8 (1931), pp. 27-50.

[59] Cf. M. Ornstein, *The Role of Scientific Societies in the Seventeenth Century*, Chicago 1938; R. Westfall, *The Construction of Modern Science: Mechanisms and Mechanics*, Cambridge-London-New York-Melbourne 1977, ch. 6.

[60] See Friedenwald, *The Jews and Medicine*, cit., I, pp. 31-68; S. Muntner, *Allilot al Rofim Yehudi'im be-Aspaklariyah shel Toledot ha-Refu'ah*, Jerusalem 1953.

[61] On this theme, see below.

[62] Benedict de Castro, *Flagellum Calumniantium seu Apologia*, Hamburg 1631, quoted in Friedenwald, *The Jews and Medicine*, cit., I, p. 65.

[63] On this, see E. Eisenstein, *The Printing Press as an Agent of Change*, Cambridge 1979, II.

[64] This point is made by Schmitt, *Science in the Italian Universities*, cit., p. 38.

[65] Cf. A. Neher, *Copernicus in the Hebraic Literature From the Sixteenth to the Eighteenth Century*, "Journal of the History of Ideas", 38 (1977), pp. 211-26.

[66] On this school, see especially the writings of A.G. Debus, especially *The English Paracelsians*, London 1965, and *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries*, 2 vols., New York 1977; J.R. Partington, *A History of Chemistry*, 4 vols., London–New York 1961-70; W. Pagel, *Paracelsus, An Introduction to Philosophical Medicine in the Era of the Renaissance*, Basel-New York 1958, and Id., *The Religious and Philosophical Aspects of van Helmont's Science and Medicine*, Baltimore 1944.

[67] Coehn, *Ma'aseh Tuviyyah*, cit., p. 93a.

[68] See, for example, *ibid.*, pp. 79b, 107a, 118b, 120a, 121a, 123b, 125b, 126a, 127b, 138b, 141a, 141b, etc. On these chemical philosophers, consult the works cited in note 66 above.

[69] See, for example, Cohen, *Ma'aseh Tuviyyah*, cit., pp. 93b, 120a, 125b, 127b, 139b.

[70] *Ibid.*, pp. 125b, 127b.

[71] On Thomas Willis, see Debus, *The Chemical Philosophy*, cit., II, ch. 7; L.R. Rather, *Pathology at Mid-Century: A Reassessment of Thomas Willis and Thomas Sydenham*, in A.G. Debus (ed.), *Medicine in Seventeenth Century England*, Berkeley-Los Angeles-London 1974, pp. 71-112; K. Dewhurst, *Thomas Willis as Physician*, Los Angeles 1964. On the five principles, see R. Hooykass, *Die Elementenlehre der Iatrochemiker*, "Janus", 41 (1937), pp. 26-28.

[72] D. Nieto, *Ha-Kuzari ha-Sheni-Mateh Dan*, ed. by J. L. Maimon, Jerusalem 1958, p. 143.

[73] A. Wallich, *Harmonia Wallichia Medica (Sefer Dimayon ha-Refu'ot)*, Frankfurt on Main 1700, pp. 47, 48, 73.

[74] Osimo, *Narrazione*, cit., p. 74.

[75] A. Portaleone, *De auro dialogi tres*, Venice 1584, pp. 1-2, where he cites Sylvius among other chemical philosophers.

[76] Cf. D. Ruderman, *Unicorns, Great Beasts and the Marvellous Variety of Things in Nature in the Thinking of Abraham b. Hananiah Yagel*, in I. Twersky (ed.), *Jewish Thought in the Seventeenth Century*, Cambridge (Mass.), 1986; D. Ruderman *The Perfect Kinship: Kabbalah, Magic and Science in the Cultural Universe of a Jewish Physician*, in print.

[77] I. Cardoza, *Philosophia libera*, Venice 1673, pp. 261 (where he mentions Paracelsus), 262-64, and elsewhere. For his later deprecation of "fallacious chemistry", see below, note 120.

[78] Jacob Zahalon, *Ozar ha-Hayyim*, Venice 1693, p. 38b, refers to Joseph Duchesne (Quercetanus) among others. For a negative view of the chemical philosophers, see Y. Kaplan, *Mi-Nazrut* le-Yahadut: *Hayyav u-Fo'alo Shel ha-Anus Yizhak Orobio de Castro*, Jerusalem 1982, p. 279.

[79] Quoted by Friedenwald, *The Jews and Medicine*, cit., I, p. 55, from Paracelsus *Labyrinthus medicorum Errantium*, 1553. Cf. F. Kudlien, *Some Interpretative Remarks on the Antisemitism of Paracelsus*, in A. G. Debus (ed.), *Science, Medicine and Society in the Renaissance: Essays in Honor of Walter Pagel*, New York 1972, I, pp. 121-26.

[80] Ecclesiastes 38:1.

[81] On this see my earlier formulation of the "ministry" of the doctor in Ruderman, *Unicorns*, cit., and see below. Cf. Debus, *The Chemical Philosophy*, cit., II, pp. 357 ff., and W. Pagel, *Religious Motives in the Medical Biology of the Seventeenth Century*, "IHM", 3 (1935), pp. 97-128, 213-31, 265-312.

[82] M. Idel, *Differing Conceptions of Kabbalah in the Early Seventeenth Century*, in Twersky (ed.), *Jewish Thought*, cit.; see also Barzilay, *Yoseph Shlomo Delmedigo*, cit., p. 295.

[83] Nieto, *Ha-Kuzari ha-Sheni*, cit., pp. 141 ff.

[84] See especially Cardoza, *Philosophia libera*, cit., pp. 1b-4a, 9 ff. (Quaestio III, "De atomis & illarum natura"); Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., pp. 225-28, 233-35.

[85] On Alemanno's interest in the spectacular in nature, see especially *Hayyai Olamin* (Ms. Mantua Jewish Community-21), fols 141b ff., the section entitled "Olam ha-Muhash". See also E.J.F. Rosenthal, *Yohanan Alemanno and Occult Science*, in *Prismata... Festschrift für Willy Hartner*, Wiesbaden 1977, pp. 349-61. On Farissol, see D. Ruderman, *The World of a Renaissance Jew: The Life and Thought of Abraham b. Mordecai Farissol*, Cincinnati 1981, cha. 10 and 11; on Yagel, see Ruderman, *Unicorns*, cit.; on Portaleone, see the previous reference. Numerous other examples are found throughout his *Shilte Gibborim* and his *De auro dialogi tres*. On de Pomis, see, for example, his discussion in Zemah David, Venice 1587, pp. 62b, 86b, 100a, 150a, 181b, 232a, etc.

[86] Cardoza, *Philosophia libera*, cit., pp. 473 ff.; de Pomis, *Zemah David*, cit., p. 62b.

[87] Each of these fields is covered comprehensively in Cohen, *Ma'aseh Tuviyyah*, cit.

[88] See note 73 above.

[89] Zahalon, *Ozar ha-Hayyim*, introduction; Friedenwald, *The Jews and Medicine*, cit., I, p. 271.

[90] Cohen and Nieto are discussed by Neher, *Copernicus*, cit. Cardoza discusses Copernicus in *Philosophia libera*, pp. 20 ff.; Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., pp. 236-37. See also below.

[91] See Neher, *Copernicus* cit., and Barzilay, *Yosef Shlomo Delmedigo*, cit.

92 Nieto, *Ha-Kuzari ha-Sheni*, cit., pp. 142 ff.

93 Cohen, *Ma'aseh Tuviyyah*, pp. 65a-b, 84b.

94 On this strategy, see Shapiro, *The Natural Sciences and Mathematics as Pathfinders*, cit., pp. 319-20; I. Zinberg, *Toledot Sifrut Yisra'el*, Tel Aviv 1960, II, appendix 2, pp. 395 ff.; cf. also J. Elbaum, *Editions of the Book "Zel Olam"*, "Kiryat Sefer", 47 (1971-72), p. 167, note 44 (in Hebrew); Yehudah ha-Levi, *Sefer ha-Kuzari*, 2:66; Maimonides, *Mishneh Torah*, Hilkhot Kiddush ha-Hodesh, 17:24; *Moreh Nevukhim*, 1:71.

95 On this theme in Jewish literature, see E. Adler, *Aristotle and the Jews*, "REJ", 82 (1926), pp. 91-102; cf. also R. Bonfil, *Expressions of the Uniqueness of the Jewish People during the Period of the Renaissance*, "Sinai", 76 (1975), pp. 36-46 (in Hebrew).

96 On Isaac Cardoza's reference to Moschus and his sources, see Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., p. 235; cf. also J.E. McGuire and P.M. Rattansi, *Newton and the "Pipes of Pan"*, "Notes and Records of the Royal Society of London", 21 (1966), pp. 108-43.

97 A sampling of these sources is found in Ruderman, *Unicorns*, cit., note 84.

98 For a discussion of the Christian theology of nature in this period, see especially R.S. Westfall, *Science and Religion in Seventeenth-Century England*, Ann Arbor (Mich.) 1973; M. Foucault, *The Order of Things: An Archeology of the Human Sciences* (English translation of *Les Mots et les Chose*, Paris 1966), New York 1970, pp. 17-50; H. Kocher, *Science and Religion in Elizabethan England*, New York 1953; J.W. Evans, *Rudolf II and His World: A Study in Intellectual History (1576-1622)*, Oxford 1973, ch. 6; see also the works cited in note 66 above and those cited in Ruderman, *Unicorns*, cit., note 68.

99 See note 94 above.

100 See note 95 above.

101 Nieto, *Ha-Kuzari ha-Sheni*, cit., p. 100.

102 *Ibid.*, pp. 101 ff.

103 *Ibid.*, p. 105.

104 *Ibid.*

105 Cohen, *Ma'aseh Tuviyyah*, cit., p. 32a.

106 A. Geiger, *Melo Ḥofnayim*, Berlin 1840, Hebrew section. J. Delmedigo *Mikhtav Aḥuz*, (ed. A. Geiger), p. 11; see also pp. 12-13.

107 Cardozza, *Philosophia libera*, cit., p. 1a (Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., p. 221).

108 *De Medico Hebraeo Enarratio Apologica*, Venice 1588, chap. 11, translated in Friedenwald, *The Jews and Medicine*, cit., I, pp. 31-53.

109 De Castro, *Flagellum Calumniantium seu Apologia*, cit. (translated by Friedenwald, *The Jews and Medicine*, cit., I, p. 60).

110 *Ibid.*, I, p. 65.

111 See the references listed in notes 97 and 98.

112 Cf. Westfall, *Science and Religion*, cit., p. 50.

113 Translated by Friedenwald, *The Jews and Medicine*, cit., I, p. 277.

114 *Esh Dat*, London 1715, p. 36b (in Petuchowski, *The Theology*, cit., p. 107).

115 *Sefer Or Nogah*, in Leibowitz, *Seridim*, cit., p. 15.

116 *Novlot Ḥokhmah*, pp. 94a ff. (cf. Barzilay, *Yoseph Shlomo Delmedigo*, cit., pp. 203-4).

[117] Delmedigo, *Sefer Elim*, cit., p. 130.

[118] Cardoza, *Philosophia libera*, cit., p. 46 (translated by Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., p. 231).

[119] *Oẓar ha-Ḥayyim*, introduction.

[120] Cardoza, *Philosophia libera*, cit., p. 4b (translated by Yerushalmi, *From Spanish Court to Italian Ghetto*, cit., p. 232). However, Cardoza, in his *Las Excelencias de los Hebreos*, Amsterdam 1679, p. 135, seems to have shifted his position. He writes (Yerushalmi's translation, p. 370): "And, in truth, Israel does not cultivate human sciences, nor treat of uncertain philosophy nor of doubtful medicine, nor of false astrology, nor of fallacious chemistry, nor of secret magic. It does not care to know the histories of the nations, nor the chronologies of the times, nor the politics of the rulers. All of its intent and desire is to study the law, and to meditate on its precepts, in order to keep and to do them". Yerushalmi attempts to explain this shift as a reflection of the intellectual milieu of sixteenth and seventeenth-century Italian Jews who oscillated between attraction and resistance to "gentile" wisdom. He links Cardoza's change of heart to those of his contemporaries – Judah Moscato, Azariah Figo, and Abraham Portaleone. See Yerushalmi, *op. cit.*, pp. 370-73.

Yosef Kaplan, on the other hand (*Mi-Naẓrut le-Yahadut*, cit., pp. 276-81), compares Cardoza's later view with a similar position of Isaac Orobio de Castro and relates both to the diffusion of sceptical currents in sixteenth and seventeenths century Europe, especially prevalent among such Converso writers as Francisco Sanchez and Michel de Montaigne. On these currents, see R. Popkin, *The History of Scepticism from Erasmus to Descartes*, Assen 1960 (revised edition, Berkeley-Los Angeles-London 1979) and his *Scepticism, Theology and the Scientific Revolution in the Seventeenth Century*, in J. Lakotos and A. Musgrave (eds.), *Problems in the Philosophy of Science*, Amsterdam 1968, pp. 1-39; C. Nauert, *Agrippa and the Crisis of Renaissance Thought*, Urbana 1965; P. Grendler, *The Rejection of Learning in Mid-Cinquecnto Italy*, "Studies in the Renaissance", 13 (1966), pp. 130-49; H. Haydn, *The Counter-Renaissance*, New York 1950.

The extent to which scepticism, and especially Pyrrhonism (associated with the revival of interest in the writings of Sextus Empiricus), influenced Jewish and Converso thinkers like Cardoza and de Castro in the sixteenth and seventeenth centuries is yet to be determined. Clearly a sceptical or fideistic reaction to rational knowledge can be located in the thought of some writers of the period. Yet a negative reaction to scholasticism need not be synonymous with scepticism in general nor with a sceptical attitude toward the new scientific discoveries in particular. It also is necessary to distinguish between a total skepticism and what Popkin calls a "constructive or mitigated scepticism", the latter employed by such thinkers as Marin Mersenne and Petrus Gassendi, both important scientific writers. I hope to consider more fully the question of scepticism in Jewish thought of the period at a later time. For the present, cf. Bonfil, *Ha-Rabbanut be-Italya bi-Tekufat ha-Renesans*, cit., pp. 188 ff.; I. Barzilay, *Between Reason and Faith*, The Hague-Paris 1967; and Idel, *Differing Conceptions*, cit., pp. 31 ff. who discussed Agrippa's influences on Jewish thought and on Jacob Ẓemaḥ in particular. Among the writers considered in this paper who appear to be influenced by sceptical and fideistic tendencies, Joseph Ḥamiẓ and David Nieto especially should be mentioned.

[121] Compare my earlier formulation regarding Yagel in Ruderman, *Unicorns*, cit.

[122] Delmedigo, *Sefer Elim*, cit., p. 92. Cf. Barzilay, *Yoseph Shlomo Delmedigo*, cit., p. 139-40.

[123] Delmedigo, *Mikhtav Aḥuz* (ed. A. Geiger), p. 13.

[124] *Ibid.*

[125] *Ta'alumot Ḥokhmah*, II, p. 80b. See Barzilay, *Yoseph Shlomo Delmedigo*, cit., pp. 316-17.

[126] Nieto, *Ha-Kuzari ha-Sheni*, cit., p. 107.

[127] Cohen, *Ma'aseh Tuviyyah*, cit., p. 11a.

[128] De Pomis, *De Medico Hebraeo*, cit., I, p. 34.

[129] Compare R. Bonfil's remark in his, *Some Reflections on the Place of Azariah de Rossi's "Meor Enayim" in the Cultural Milieu of Italian Renaissance Jewry*, in *Jewish Thought in the Sixteenth Century*, Cambridge (Mass.), 1983, pp. 34-37.

[130] Compare, for example, the reactions found in the letter of Naphtali, in S.R. Hirsch's *The Nineteen Letters of Ben Uziel*, translated by B. Drachman, New York 1942, from the beginning of the nineteenth century.

[131] This theme among Christian writers is developed by Westfall in the last chapters of *Science and Religion*, cit.

[132] Cf. Petuchowski, *The Theology of Haḥam David Nieto*, cit., p. 114.

[133] Cohen, *Ma'aseh Tuviyyah*, cit. p. 9a.

[134] *Ta'alumot Hokhmah*, II, p. 94b.

[135] Cardoza, *Philosophia libera*, cit., p. 726: "esse non tantum est propositio de fide, sed universale nature axioma luminea, naturali impressum".

[136] See Petuchowski, *The Theology of Haḥam David Nieto*, cit., ch. 8.

[137] Compare the remarks of Popkin in *Scepticism, Theology and the Scientific Revolution*, cit., on this point.

[138] Cohen's discussion of Copernicus is found in *Ma'aseh Tuviyyah*, cit., pp. 49b-52b; Nieto's discussion is in *Ha-Kuzari ha-Sheni*, cit., pp. 126-28. Compare with Neher, *Copernicus*, cit., who notes only their rejection of Copernicus.

[139] Nieto, *Ha-Kuzari ha-Sheni*, cit., pp. 129-30.

[140] Cohen, *Ma'aseh Tuviyyah*, cit., p. 53a.

[141] On the debate over a plurality of inhabitable worlds in this period and earlier, see especially S.J. Dick, *Plurality of Worlds: The Origins of the Extraterrestrial Life Debate from Democrites to Kant*, Cambridge 1982; G. McColley, *The Seventeenth Century Doctrine of a Plurality of Worlds*, "Annals of Science", 1 (1936), pp. 385-430; P. Rossi, *Nobility of Man and Plurality of Worlds*, in Debus (ed.), *Science, Medicine and Society in the Renaissance*, cit., II, pp. 131-62. Hasdai Crescas's view of infinite worlds is discussed by H.A. Wolfson, *Crescas's Critique of Aristotle*, Cambridge 1929, pp. 215-17.

[142] Nieto, *Ha-Kuzari ha-Sheni*, cit., pp. 126-28.

[143] Cohen, *Ma'aseh Tuviyyah*, cit., pp. 67a-68a.

[144] Delmedigo, *Sefer Elim*, cit., pp. 292-93.

[145] Cardoza, *Philosophia libera*, cit. pp. 124-25. Cf. a later critique of plurality in E.Ph. Hurwitz, *Sefer ha-Berit*, Brunn 1797; *Ma'amar*, 3, ch. 2, pp. 15a-17a.

[146] Cf. J. Katz, *Out of the Ghetto*, Cambridge (Mass.), 1973, pp. 43-44, who minimizes the significance of this encounter.

[147] Benayahu, *R. Abraham ha-Cohen of Zante*, cit., p. 119. As discussed at the *tavola rotonda* at which this paper initially was presented, the conclusion of R. Bonfil's paper (*Cultura e mistica a Venezia nella seconda metà del Cinquecento*) about the relative closing of cultural links between Jews and Christians by the second half of the sixteenth century, need not be construed as totally contradictory to those of this paper. In the first place, each paper focuses on somewhat different circles

within the Jewish community. Secondly, both papers confirm the view that Italian Jews lost interest in metaphysical-philosophic speculation after 1550; they focused instead on either naturalistic-pragmatic or mystical pursuits. Thirdly, the study of nature for many Jews could easily be combined with kabbalistic proclivities.

At the same time, the evidence of this paper suggests that certain cultural links forged by Jews with non-Jewish society not only continued but even flourished throughout the sixteenth and seventeenth centuries. Despite their turning inward, Jews were never indifferent to the cultural developments of their non-Jewish contemporaries. To my mind, Simone Luzzato, scientist and devotee of humanistic culture, was never as lonely or pessimistic as Bonfil suggests he was by the end of his lifetime.

*ragioni di questi periodi di produzione ridotta: in primo luogo ho preso in esame l'influenza delle leggi veneziane sulla stampa, pubblicate in un noto volume di Brown (*The Venetian Printing Press, 1469-1800: A Historical Study Based upon Documents for the Most Part Hitherto Unpublished, *Londra 1891, rist. Amsterdam 1969), e ne ho dedotto che questa fu indubbiamente un fattore di grande rilievo. Nello stesso tempo ho tenuto conto delle vicende interne alla stamperia, e in modo particolare il ruolo del famoso "majordomo" Cornelio Adelkind, che vi lavorò dal 1519 fino alla chiusura, avvenuta nel 1549. La parte principale della descrizione dell'attività di Cornelio Adelkind nella stamperia Bomberg manca in questa relazione, in quanto compresa nella sezione dedicata all'ultimo periodo.*

Vorrei concludere ribadendo che, pur essendovi fasi alterne nella storia della sua casa, nell'insieme il contributo di Daniel Bomberg alla tradizione ebraica fu immenso.

RUDERMAN *Cozzi ha ricollegato in modo assai convincente le condizioni politico-economiche di Venezia all'evoluzione della cultura ebraica locale. Il problema fondamentale che si pone di fronte a questo convegno è di stabilire quale genere di cultura ebraica si affermi nel contesto della società veneziana, e di quella veneta più in generale. E ancora, quali sono i contatti tra questa esperienza culturale e il mondo esterno? Si tratta di una esperienza culturale originariamente aperta, che tende a chiudersi sempre più con l'avanzare dei secoli XVI e XVII?*

Bonfil ha ricostruito le origini di uno sviluppo culturale all'interno di Venezia, situandolo nel contesto di una struttura economica e politica in via di trasformazione. Del quadro culturale da lui tracciato l'elemento portante è il misticismo ebraico, inteso come riflesso di una determinata situazione sociale, economica, di un particolare spazio fisico. Nei primi anni del secolo XVI il quadro è caratterizzato dall'apertura: ebrei e cristiani hanno la possibilità di incontrarsi in un confronto intellettuale sul valore della tradizione esoterica ebraica. Coll'andare del tempo il clima politico-sociale cambia; con l'ingresso nel Ghetto di consistenti gruppi di emigrati spagnoli si afferma un genere diverso di kabbalà, *una diversa esperienza culturale ebraica che si rivolge verso l'interno, che si rimuove, e diventa indifferente al mondo esterno.*

All'interno di questo quadro vorrei riuscire a collocare anche il mio modesto contributo al convegno. Nella mia ricerca sugli studenti di medicina ebrei a Padova, piuttosto che una chiusura dell'interazione tra gli ebrei e la società gentile, ho riscontrato la presenza, a partire dal secolo XVI e fino a tutto il XVIII, della possibilità per numerosi ebrei di acquisire una istruzione formale e sistematica pres-

so un'università che all'inizio era la migliore d'Europa, e che, nonostante il rapido declino nei secoli XVII e XVIII, conservava ancora il suo prestigio, offrendo ai suoi studenti di medicina anche una solida preparazione nelle arti liberali.

L'esistenza di questa opportunità affatto unica fece di Padova, e del Veneto, un momento centrale per la diffusione della cultura secolare tra gli ebrei; e non soltanto per quelli residenti nella regione, ma per tutto il mondo ebraico, in particolare per quello dell'Europa centro-orientale e della Germania. Non ci troviamo necessariamente di fronte a un chiusura, bensì ad una esperienza di tipo diverso. Un'apertura, per alcuni ebrei almeno, attraverso il veicolo della medicina; un'interazione che continua fino a tutto il secolo XVIII.

La domanda che vorrei porre è questa: si concilia il ritratto delineato da Bonfil con quello di questi studenti di medicina? Parliamo forse di esperienze culturali diverse? Le nostre interpretazioni sono entrambe errate? Il quadro che ci siamo fatti di un'epoca culturale pecca forse di esagerazione?

Come punto di partenza vorrei sostenere che nessuno dei due ha torto: si tratterebbe insomma delle due facce della stessa medaglia. Nel complesso contesto socioeconomico di Venezia e del Veneto viene a crearsi davvero, nei secoli XVI e XVII, una situazione in cui gli ebrei si ripiegano su se stessi, in cui il misticismo assume una forma più specificamente ebraica, ma l'impegno, il coinvolgimento nella cultura secolare non scompare. Invece che di differenza nei confronti del mondo culturale esterno sarà forse meglio parlare di indifferenza per un genere particolare di esperienza culturale, quella della scolastica e della filosofia metafisica. Gli ebrei, come i loro colleghi cristiani, rimangono sempre meno affascinati dai tentativi di colmare il divario tra la propria tradizione e il mondo della filosofia e del razionalismo. Cercano invece nelle tradizioni dei padri le risposte ai problemi che devono affrontare nel loro mondo.

Se però la metafisica non costituisce più, ai loro occhi, un imperativo, il mondo fisico della natura, le occasioni pratiche del mondo sono invece più facili da integrare nella loro concezione ebraica di se stessi e della propria identità. In altre parole, l'essere un medico ebreo o un mistico ebreo non comporta di necessità una contraddizione di termini. Anche molti medici ebrei attribuirono grande significato al misticismo dei secoli XVI e XVII, e in qualche modo riuscirono a mettere in rapporto questi due mondi diversi all'interno della loro esperienza ebraica. L'incontro della comunità ebraica italiana con quella dell'Europa orientale e della Germania, per di più, è favorito sì dai legami mistici che le uniscono, ma anche da quello della medicina, che passa, come ho detto, dalla Polonia e dalla Germania in Italia, e da qui a Costantinopoli.

Un ultima cosa prima di concludere. Alla fine della sua relazione Adler ritorna su un gruppo importante, lo stesso su cui si è soffermato Horowitz: la confraternita Shomrim la-boqer, *che secondo Bonfil rappresenta un'involuzione, un segno dell'indifferenza per il mondo esterno. Mi è parso però significativo che questo stesso gruppo di mistici ripiegati su se stessi ingaggino un gentile, un non-ebreo che componga per loro una* cantata. *Si tratta insomma di ebrei profondamente immersi nella propria tradizione culturale, che però non hanno tagliato tutti i ponti con il mondo estetico dei contemporanei non-ebrei.*

Olivieri *Ho deciso pure io di dare alcune delucidazioni a proposito delle origini, delle finalità più dettagliate di questo mio lavoro sulla medicina ebraica tra la fine del Quattrocento e gli inizi del Cinquecento.*

Mi sono proposto di tentare un'analisi e un recupero il più possibile dettagliato (sulla base degli atti notarili, della diaristica, della letteratura corrente) di quel particolare tipo di medico che i documenti veneziani e mediterranei del tempo definiscono "ricercatore di ingegni". L'altra finalità era naturalmente di trovare una caratterizzazione di questo particolare tipo di cultura medica, che in un certo senso la distingua dall'identificazione fin troppo facile con il folklore o con la divulgazione dei segreti medici all'interno dello stato, individuando un'area culturale a cui profughi ebrei mediterranei, e non solo quindi veneziani, avessero dato il loro contributo nello stesso arco di tempo. È un tipo di medicina particolare, che sulla base dei trattati non esiterei a definire sperimentale, cioè basata sull'esperienza di ricerca, sull'esperienza di applicazione, sull'esperienza di controllo personale, e che si pone di fronte ai principali problemi della città, quale si viene a costruire, a formulare nel Cinquecento. Il problema della funzionalità della casa, il problema della prevenzione contro la peste, la ricerca anche di una salubrità, nell'accezione ermetica e neoplatonica del termine, ma anche nel senso più direttamente sperimentale.

La diaristica rileva la circolazione di questi gruppi di medici ebrei per tutte le corti del Mediterraneo; tra le finalità del mio lavoro, mi sono dunque proposto di accentrare il ruolo della corte, anche come luogo di trasmissioni, di circolazione, di caratterizzazione di questo particolare tipo di cultura medica. In particolare mi è sembrato di individuare alcuni tragitti abbastanza precisi: Costantinopoli, Venezia, Mantova, Ferrara, cioè un particolare tipo di problematica e di circolazione culturale all'interno delle strutture di corte a cui questa medicina o questi gruppi di medici in un certo senso si congiungono.

Gli Ebrei e Venezia

secoli XIV-XVIII

Atti del Convegno internazionale
organizzato dall'Istituto di storia della società
e dello stato veneziano
della Fondazione Giorgio Cini

Venezia, Isola di San Giorgio Maggiore
5-10 giugno 1983

A cura di Gaetano Cozzi

Edizioni
Comunità

ISBN 880429445-0

I edizione, gennaio 1987